



## PREVALENCE OF METABOLIC SYNDROME AMONG ETON MEN CAMEROON (YAOUNDE)

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### ABSTRACT

**Background:** Metabolic Syndrome is now considered as important factor of cardiovascular mortality around the world. Several studies show that its occurrence varies with factors such as ethnicity, gender and many others. **Objective:** This cross sectional study determines the prevalence of metabolic syndrome among Eton healthy adults who attended cardiovascular diseases free screening campaign in Yaounde Cameroon. The definition used is that of National Cholesterol Education Program Adult Treatment Panel III (NCEP ATP III) 2001.

**Results:** The reported prevalence of metabolic syndrome among our Eton men was 29.62%. Waist circumference, HDL-cholesterol, fasting blood glucose, diastolic blood pressure, Systolic blood pressure, and triglyceride were not significantly higher among Eton men with metabolic syndrome (P-value<0.05). The most prevalent components of metabolic syndrome in our study were hypocholesterolemia HDL (86.05%) and hypertension (39.53%). 16.28%, 1.16% and 0.0% of

Eton men had three, four and five criteria for metabolic syndrome, respectively. **Conclusion:** Metabolic Syndrome is frequent amongst Eton men of Yaoundé.

**KEYWORDS:** Metabolic Syndrome, Individual Components, Eton ethnic men, Yaounde-Cameroon.

## INTRODUCTION

Metabolic syndrome is a worldwide public health problem and consists of the aggregate of at least 3 of these cardiometabolic risk factors: central obesity, hypertension, hypertriglyceridemia, low plasma high-density lipoprotein (HDL) cholesterol levels and hyperglycemia.<sup>[1,2]</sup> People having metabolic syndrome are at increased risk for type 2 diabetes, cardiovascular disease, morbidity and mortality increases.<sup>[3,4]</sup> Several diagnostic criteria for metabolic syndrome have been proposed and the widely accepted and clinically used definition is ATP III definition.<sup>[5]</sup> Prevalence of metabolic syndrome and its individual component varies according to age distribution, socioeconomic or nutritional statuses, physiology, country and ethnic groups.<sup>[6,7,8,9]</sup> Little data concerning metabolic syndrome and ethnic groups exist in Cameroon.<sup>[10,11]</sup> and no previous study has assessed metabolic syndrome among Eton men. The purpose of this study is therefore to estimate the prevalence of metabolic syndrome among Eton men community of Yaoundé according to the scheme of National Cholesterol Education Program Adult Treatment Panel III (NCEPATPIII).<sup>[5]</sup>

## MATERIALS AND METHODS

### Ethics

Internal medicine students in Cardiology during the Eton meetings of November 2014 did a talk related to the burden of Cardiovascular Diseases and its prevention in Cameroon. At the end of the talk, the students delivered handouts explaining the study conditions, objectives, procedures, risks and benefits and data confidentiality. Admission to the study was based solely on voluntary participation. The study volunteers were referred to the Holy Spirit Medical Center Yaounde Cameroon. Females were excluded from the study. All participants in the study provided verbal informed consent. The study was approved by the Education Planning Commission of the center. All measurements and questionnaires were in accordance with the Helsinki Declaration (1983 version).

### Subjects

This cross-sectional study was performed from November to December 2015, the study team worked in all week days except Sundays. The study population consisted of adult Eton individuals.

The data collection comprised a healthcare questionnaire, anthropometric measurement of weight, height, and abdominal circumference, health examination and laboratory tests in the fasting state for lipids.

Height, weight, and waist circumference were all measured using standardized techniques and calibrated equipment. BMI was calculated by dividing weight by height squared ( $\text{kg/m}^2$ ) classified according to WHO rules  $\geq 30$ .<sup>[12]</sup>

A well trained nurse drew fasting morning blood samples from the examinee's arm for the lipid. Standardized techniques were used to obtain the blood pressure measurements after at least 10 min of rest.

Waist circumference was taken with the subject in a standing position, to the nearest millimetre, using a non-stretchable tape measure at the mid-point between the lowest rib and the iliac crest in expiration. The height was measured in standing position using tape meter while the shoulder was in a normal position to the nearest millimetre (Siber Hegner, Zurich, Switzerland). Body weight and body fat were determined in 12-h fasted participants (with very light clothing on and without shoes) using a Tanita™ scale. Fasting venous blood (5ml) was collected from participants into heparinised tubes between 6:00 and 10:00 am in the laboratory. Total cholesterol and triglycerides in plasma were measured using previously described standard methods.<sup>[13,14]</sup> High Density Lipoprotein cholesterol was determined using a heparin manganese precipitation of Apo B-containing lipoproteins.<sup>[15]</sup> Fasting capillary blood glucose was determined using glucose test strips (Gluco Plus TM).

### Definition of Metabolic Syndrome

Men were considered to have Metabolic Syndrome if they had three or more of the following criteria, according to the ATP III criteria.<sup>[5]</sup>

- 1) Abdominal Obesity: Waist Circumference  $\geq 102$ cm for men,
- 2) Hypertriglyceridemia: Triglycerides  $\geq 150$  mg/dl or drug treatment for elevated Triglycerides.
- 3) Low High Density Lipoprotein-C ( $< 40$  mg/dl for men), or drug treatment for low HDL-C.
- 4) Hypertension: known hypertensive or Systolic Blood Pressure  $> 130$ mm Hg, and or Diastolic Blood Pressure  $> 85$  mmHg or drug treatment for elevated blood pressure.
- 5) Dysglycemia: known diabetes mellitus or fasting plasma glucose  $> 110$  mg/dl or drug treatment for elevated blood glucose.

### Statistical analysis

All data were analyzed by STATA® 8.2. Continuous variables are reported as means  $\pm$  standard deviations (SD) and categorical variables are presented as percentages. The

distribution of continuous variables was assessed by Kolomogrov-Smirnov test and a normal distribution was demonstrated. A *p* value less than 0.05 was considered statistically significant.

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## RESULTS

A total of 86 Eton men participated for the study out 182 meeting member sensitized. Table 1 shows the characteristics of Eton men with and without metabolic syndrome. The mean age was  $27.87 \pm 6.83$  years and the mean BMI was normal  $24.04 \pm 3.80$  kg/m<sup>2</sup>. Waist circumference, HDL-cholesterol, fasting blood glucose, diastolic blood pressure, Systolic blood pressure, and triglyceride were not significantly higher among Eton men with metabolic syndrome. Table 2 summarizes the prevalence of each individual metabolic syndrome components. The prevalence of low HDL-cholesterol was 86.05%, hypertension (39.53%), hypertriglyceridaemia (23.81%), waist circumference (22.09%) and fasting blood glucose (02.33%). It appears that the most frequent metabolic components in Eton men were low HDL-cholesterol (86.05%) and hypertension (39.53%), in comparison to the other metabolic components. The poll has shown 15 individuals of the study population have metabolic syndrome whose prevalence was 17.44%. Table 3 shows metabolic syndrome items which shows 15.00%, 13.3% and 1.8% of Eton men had three, four and five criteria for metabolic syndrome respectively. Table 4 represents age trend distribution of Eton men with and without metabolic syndrome. The most age distribution was aged between 18-29 years where the prevalence of metabolic syndrome was significantly high. A decreasing frequency of metabolic syndrome from the age of 18-29 years (11.63%) to the age of 30-39 years (5.81%) was noted. No participant belongs to the age trend of 40-49 years and 50-60 years.

**Table 1: Baseline data of Eton men with and without metabolic syndrome.**

Parameters	Total	Eton men with MetS	Eton men without MetS	P value
All men, No. (%)	86	15	71	-
Age (years)	$27.87 \pm 6.83$	$26.73 \pm 3.67$	$28.11 \pm 7.32$	0.240
BMI, kg/m <sup>2</sup>	$24.04 \pm 3.80$	$23.84 \pm 4.35$	$24.08 \pm 3.71$	0.412
WC, cm	$81.05 \pm 9.19$	$80.73 \pm 9.71$	$81.12 \pm 9.15$	0.440
SBP, mmHg	$124.31 \pm 13.84$	$123.26 \pm 10.39$	$124.54 \pm 14.52$	0.374
DBP, mmHg	$78.70 \pm 11.36$	$78.20 \pm 10.92$	$78.81 \pm 11.53$	0.425

FBS, mg/dl	83.33±10.65	83.33±9.00	83.33±11.02	0.499
TG, mg/dl	101.38±44.31	117.00±51.26	98.52±42.71	0.084
T-Chol, mg/dl	159.80±40.04	155.06±40.02	160.80±41.02	0.443
HDL-Chol, mg/dl	30.61±16.40	26.80±16.75	31.42±16.33	0.162

$p < 0.05$  was considered significant.

MetS: Metabolic syndrome BMI: Body mass index, WC: waist circumference, SBP: systolic blood pressure, DBP: diastolic blood pressure, FBS: fasting blood glucose, TG: triglyceride, T-CHOL: total cholesterol, HDL-CHOL: HDL-cholesterol and LDL-CHOL: LDL-cholesterol.

**Table 2: Metabolic syndrome Prevalence and its components among Eton men.**

	<b>Eton men</b>
<b>Metabolic Syndrome</b>	15 (17.44%)
Hyperglycemia	2 (02.33%)
Low HDL	74 (86.05%)
High Triglycerides	20 (23.81%)
Abdominal obesity	19 (22.09%)
Hypertension	34 (39.53%)

**Table 3. Metabolic Syndrome Items.**

<b>Parameters</b>	<b>Eton men</b>
0 criteria n (%)	1 (1.16 %)
1 criteria n (%)	38 (44.19%)
2 criteria n (%)	32 (37.21%)
3 criteria n (%)	14 (16.28%)
4 criteria n (%)	1 (1.16 %)
5 criteria n (%)	0 (0.00%)

**Table 4: Age trend distribution of Eton men with and without metabolic syndrome.**

<b>Age groups in years</b>	<b>men without MetS (n=71)</b>	<b>men with MetS (n=15)</b>
<b>18-29n (%)</b>	52(60.47%)	10(11.63%)
<b>30-39n (%)</b>	12(13.95%)	5(5.81%)
<b>40-49 n (%)</b>	6(6.98%)	0(0.00%)
<b>50-60 (%)</b>	1(1.16%)	0(0.00%)

## DISCUSSION

Metabolic syndrome is a global health problem currently occupying the front burner in clinical and public health practice.<sup>[16]</sup> It is a cluster of biochemical and anthropometric abnormality that has high predictive ability for the development of atherosclerotic

cardiovascular diseases.<sup>[17]</sup> It is a major public-health and clinical worldwide challenge in the wake of urbanization. In Cameroon, death related to cardiovascular diseases is rising.<sup>[18]</sup>

In developing countries, metabolic syndrome prevalence differences may be related to age distribution, nutritional statuses and ethnical differences. Several studies have proposed that some risk factors such as no physical activity, family history of diabetes, hypertension and cardiovascular disease and cigarette smoking may play an important role in progressing of metabolic syndrome. Our cross sectional study was designed to determined the prevalence of metabolic syndrome and its components among Eton men living in Yaoundé, Cameroon. According to the results, the frequencies of metabolic syndrome components were low HDL-cholesterol (86.05%), hypertension (39.53%), hypertriglyceridaemia (23.81%), waist circumference (22.09%) and fasting blood glucose (02.33%) was the lowest prevalence. The most frequent components in subjects are low HDL-cholesterol (86.05%) and this latter remark is consistent with normal weight Cameroonian study<sup>[20]</sup>, Bamiléké women<sup>[10]</sup> and these other foreign studies in USA<sup>[21]</sup>, Canada<sup>[22]</sup>, Turkey<sup>[23]</sup>, Our findings did not agree with the Mbo women<sup>[11]</sup> study where the most frequent metabolic syndrome component was hypertension. In our study, we found that the mean body mass index, waist circumference, hip circumference, diastolic blood pressure, and triglyceride and fasting blood glucose levels were not statistically different among Eton men with and without metabolic syndrome. Some reason may explain this surprising result. Firstly the genetic origins of metabolic syndrome level of among Eton men. Secondly lifestyle change, in fact Eton men villages are direct frontier village of native Yaounde individuals, for this reason availability of their traditional diet is very high and therefore a low level of nutrition transition among Eton is possible. According to the NCEP-ATPIII criteria, the findings of this study indicate that the general prevalence of metabolic syndrome among Eton men was 17.44%. This prevalence was decreasing with age even the majority of the population was young and the subjects had normal weight. As repartition, 16.28% had three metabolic components, 1.16% had four metabolic components but none had five. Another aspect of this study revealed the poor motivation of elders for the study and that attitude will be a brake for establishment of cardiovascular diseases prevention policy in Cameroon. The frequency of metabolic syndrome was highest in the youngest age trend, although the genetic aspects of metabolic syndrome is quite important, several studies have revealed that lifestyle change also play a crucial role, in general the young individual are fascinate with outside African fast food such donut, beans and porridge that they eat and drink in the evening.

The limitations in our study were its cross sectional design and lower participation of Eton men that findings should be further confirmed with large scale longitudinal studies.

## CONCLUSION

They were not a significant difference in the metabolic syndrome components in Eton men with and without metabolic syndrome. Also, low HDL-cholesterol level and high blood pressure are the most frequent characteristics in comparison to other metabolic components.

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## Declaration of Conflicting Interest

The authors declare that there are no conflicts of interest.

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